

WHAT IS CLAIMED IS:

1. A method for producing an optical waveguide substrate at least comprising a step of forming a silica film to be an optical waveguide having a thickness of 5  $\mu\text{m}$  or more on a surface of a substrate by oxidizing a silicon substrate wherein the oxide film is formed by forming an oxide film having a film thickness of 0.3  $\mu\text{m}$  or more on the silicon substrate first, and then oxidizing the silicon substrate in an oxidizing atmosphere heated at 1000°C or higher to form a remaining oxide film.

2. The method for producing an optical waveguide substrate according to Claim 1 wherein the oxide film having a film thickness of 0.3  $\mu\text{m}$  or more is formed first on the silicon substrate by thermal oxidization in an oxidizing atmosphere heated at 1000°C or higher.

3. The method for producing an optical waveguide substrate according to Claim 1 wherein the oxidizing atmosphere is an atmosphere containing steam.

4. The method for producing an optical waveguide substrate according to Claim 2 wherein the oxidizing atmosphere is an atmosphere containing steam.

5. The method for producing an optical waveguide substrate according to Claim 1 wherein the substrate is

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washed between the step of forming an oxide film having a film thickness of 0.3  $\mu\text{m}$  or more first on a silicon substrate and the next step of forming the remaining oxide film.

6. The method for producing an optical waveguide substrate according to Claim 2 wherein the substrate is washed between the step of forming an oxide film having a film thickness of 0.3  $\mu\text{m}$  or more first on a silicon substrate and the next step of forming the remaining oxide film.

7. The method for producing an optical waveguide substrate according to Claim 3 wherein the substrate is washed between the step of forming an oxide film having a film thickness of 0.3  $\mu\text{m}$  or more first on a silicon substrate and the next step of forming the remaining oxide film.

8. The method for producing an optical waveguide substrate according to Claim 4 wherein the substrate is washed between the step of forming an oxide film having a film thickness of 0.3  $\mu\text{m}$  or more first on a silicon substrate and the next step of forming the remaining oxide film.

9. An optical waveguide substrate that a silica film

to be an optical waveguide having a film thickness of 5  $\mu\text{m}$  or more is formed by oxidizing a silicon substrate on a surface of the silicon substrate wherein particles having a size of 0.3  $\mu\text{m}$  or more adhered on the surface of the optical waveguide substrate are 500 numbers/ $\text{cm}^2$  or less.